Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

Chemical protein engineering to design inhibitors of disease related protein-protein interactions

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Proteins, the building blocks of life, are biologically synthesised by cellular ribosomes. In contrast, chemical protein synthesis, using techniques like solid phase peptide synthesis and native chemical ligation, leverages principles of laboratory organic chemistry and outperforms biological machinery in precisely manipulating protein backbone and side chain functionality. Recent advances in chemical synthesis techniques have allowed scientists to create and chemically engineer proteins in ways once thought impossible, thereby opening up new avenues for drug discovery. My dissertation centres on leveraging state-of-the-art chemical tools for protein/peptide synthesis and engineering, employing biophysical and biochemical methods to study structure-function relationships and conducting biological assays to glean insights into the utility of these molecules against disease-related protein-protein interactions. In my presentation, I will discuss about novel approaches that simplify chemical protein synthesis, showcasing their successful implementation in the total chemical synthesis of the SARS-CoV-2 spike protein. In addition, I will detail my endeavours in chemical peptide engineering, resulting in the development of inhibitors that effectively imped the invasion of malaria parasites into red blood cells. Finally, I will discuss an innovative application of dynamic combinatorial chemistry to identify a peptide that binds to the phenol-soluble modulin α3 from *Staphylococcus aureus*.

Thursday, Feb 15th 2024

8:30 Hrs (Tea / Coffee 8.15 Hrs)

Auditorium, TIFR-H